

Serial No. 10/066,764  
Reply dated **February 11, 2004**  
In Response to Office Action dated October 17, 2003

Docket No. K-0392

### **REMARKS**

Claims 1-7 and 9-11 are pending in this application. By this Amendment, claims 1, 2, 4, 6 and 9 are amended, and claim 8 is canceled without prejudice or disclaimer of the subject matter therein. In addition, Figs. 4 and 7 have been amended to correct informalities. Replacement sheets that include corrected Figs. 4 and 7 are attached.

Reconsideration in view of the above amendments and remarks is respectfully requested. Unless otherwise indicated in the remarks set forth below, the amendments to the claims are made for the purpose of correcting informalities and/or to more clearly define the claimed invention, and are not made for the purpose of overcoming the cited art.

Applicants appreciate the courtesies extending to Applicants' representative, René A. Vázquez, during the February 9, 2004 personal interview. The substance of the personal interview is incorporated in the remarks set forth below.

### **Claim Objections**

The Office Action objects to claim 8 because of informalities. Claim 8 has been amended to address the informalities. Accordingly withdrawal of the objection to claim 8 is respectfully requested.

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### **Drawing Objections**

The Office Action objects to the drawings under 37 C.F.R. 1.83a because the drawings allegedly do not show every feature of the invention specified in the claims. Figs. 4 and 7 have been amended, as shown in the attached replacement sheets, to add labels for the first and the second fiber support substrates and first and second micro-mirror support substrates. In addition, the specification has been amended to conform to the drawings. No new matter has been added.

Accordingly, Applicants respectfully submit that the drawings show every feature of the invention specified in the claims. Thus, withdrawal of the objection to the drawings is respectfully requested.

### **Rejection Under 35 U.S.C. § 102(a)**

The Office Action rejects claims 1-4 under 35 U.S.C. § 103(a) as unpatentable over Daneman et al. (U.S. Patent No. 6,330,102 – hereinafter “Daneman”) in view of Gloeckner et al. (U.S. Patent No. 6,445,841 – hereinafter “Gloeckner”), and further in view of Magel et al. (U.S. Patent No. 5,155,778 – hereinafter “Magel”). This rejection is respectfully traversed.

Applicants respectfully submit that Daneman, Gloeckner and Magel fail to establish a *prima facie* case of obviousness, as required under 35 U.S.C. § 103(a). The Office Action alleges that Daneman teaches all of the features of claim 1, with the exception of “a substrate for the

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mechanical coupling of fibers and mirrors to the alignment grooves of the substrate.” The Office Action then alleges that Gloeckner discloses an optical switch with optical elements, such as fibers, mirrors and lens, situated and fixed on a substrate, and that Magel discloses an optical switch with optical elements, such as fibers, mirrors, and lenses situated and fixed on a substrate. and fit within grooves.

However, as discussed during the personal interview, Applicants respectfully submit that Daneman fails to teach or suggest an input optical fiber part, comprising a first fiber support substrate attached to a first substrate, an output optical fiber part, comprising a second fiber support substrate attached to the first substrate, a first micro-mirror part, comprising a first micro-mirror support substrate attached to the first substrate and positioned between the input optical fiber part and the output optical fiber part, and a second micro-mirror part, comprising a second micro-mirror substrate attached to the first substrate and positioned to reflect light from the first micro-mirror part to the output optical fiber part, wherein at least two of the first fiber support substrate, the second fiber support substrate, the first micro-mirror substrate and the second micro-mirror support substrate are mechanically coupled to respective alignment grooves formed in the first substrate, as recited in claim 1.

This is because the teaching of Daneman is directed solely at elements that form a beam steering module and switching system, and does not address how the individual components of the beam steering module are attached. Thus, Daneman does not teach or suggest how the

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components that make up the beam steering module may be attached to, for example, a substrate. Since Daneman does not even address the issue of attaching the various components to a substrate, Daneman certainly does not teach or suggest respective alignment grooves formed in a first support substrate that are mechanically coupled to at least two of a first fiber support substrate, a second fiber support substrate, a first micro-mirror support substrate and a second micro-mirror support substrate, as recited in claim 1.

Gloeckner fails to remedy the deficiencies noted above in Daneman. Gloeckner is directed to an optomechanical matrix switch that includes optical fibers that are individually and directly attached to a substrate, as well as micro-mirrors that are individually and directly attached to the same substrate that the optical fibers are attached. The Office Action alleges that it would have been obvious to one of ordinary skill in the art at the time the invention was made “to have fixed the elements disclosed by Daneman on a substrate as in Gloeckner since one would be motivated to provide a structure that offers advantages from the architecture and packaging point of view.”

However, Applicants respectfully submit that neither Daneman nor Gloeckner teach the use of fiber support substrates and micro-mirror support substrates to support respective optical fiber parts and micro-mirror parts, and then attaching those support substrates to a common substrate via respective alignment grooves formed in the common substrate. Specifically, neither Gloeckner nor Daneman teach or suggest an input optical fiber part, comprising a first fiber

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support substrate, an output optical fiber part, comprising a second fiber support substrate, a first micro-mirror part, comprising a first micro-mirror support substrate, and a second micro-mirror part comprising a second micro-mirror support substrate, in which at least two of the first fiber support substrate, the second fiber support substrate, the first micro-mirror support substrate and the second micro-mirror support substrate are mechanically coupled to respective alignment grooves formed in the first substrate, as recited in claim 1.

Further, Magel fails to remedy the deficiencies noted above in Daneman and Gloeckner. Magel discloses an optical switch in which lenses are attached to a substrate. For example, see Fig. 1 of Magel, in which lenses 14a and 14b are attached to a substrate 10. Further, Magel teaches the use of a single spatial light modulator for directing light between the input and output fibers. The second set of mirrors used in Magel are fixed mirrors (elements 16a and 16b in Fig. 1) formed from the substrate 10. Thus, there is no teaching or suggestion as to how the first and second mirror arrays of Daneman would be positioned and attached to the common substrate.

Thus, for at least the reasons set forth above, Applicants respectfully submit that the combination of Daneman, Gloeckner and Magel fail to render obvious the subject matter of claim 1. Claims 2-4 depend from claim 1, and thus are also allowable for at least the reasons set forth above, and for the additional features they recite.

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For example, claim 3 recites that each of the respective alignment grooves have upper slope sides, and lower vertical sides, to form a “Y”. The Office Action alleges that Magel’s description of “properly dimensioned grooves” teaches the Y-shaped grooves recited in claim 3. However, as discussed during the personal interview, the “properly dimensioned grooves” taught by Magel refer to grooves that have the same shape as the component they are designed to support, as shown in Figs. 1, 5 and 6 of Magel. This teaches away from the Y-shaped grooves recited in claim 3, which have a different shape than the support substrates they are designed to support.

Accordingly, for at least the reasons set forth above, withdrawal of the rejection of claims 1-4 under 35 U.S.C. § 103(a) is respectfully requested.

The Office Action rejects claims 5-11 under 35 U.S.C. § 103(a) as unpatentable over Daneman and Magel, in view of Peale et al. (U.S. Patent No. 6,480,645 – hereinafter “Peale”). Claim 8 has been canceled. The rejection of claims 5-7 and 9-11 is respectfully traversed.

Claims 5-7, 9 and 10 depend from claim 1. Thus, Applicants respectfully submit that claims 5-7, 9 and 10 are allowable for at least the reasons set forth above, as well as for the additional features they recite. Further, Peale fails to remedy the deficiencies noted above in Daneman and Magel.

For example, the Office Action alleges that Peale discloses an optical switch with a substrate at the face of the plurality of input and output fiber parts. The Office Action refers to

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elements 30 and 35 of Fig. 2 in Peale to support this assertion. However, as discussed during the personal interview, elements 30 and 35 are lens arrays spaced apart from respective fiber arrays 20 and 25. This teaches away from an array of optical fibers coupled to a fiber support substrate, and two dimensional arrays of micro-mirrors coupled to micro-mirror substrates, as recited in claim 6.

Claim 11 recites features similar to those recited in claim 1, except that claim 11 calls for all of the first and second fiber support substrates, and the first and second micro-mirror support substrates to be supported on the first substrate by respective alignment grooves formed in the first substrate. As discussed above, Daneman and Magel, either alone or in combination, fail to teach or suggest these features. Further, Peale fails to remedy the deficiencies noted above in Daneman and Magel.

Accordingly, for at least the reasons set forth above, withdrawal of the rejection of claims 5-11 under 35 U.S.C. § 103(a) is respectfully requested.

### **CONCLUSION**

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **René A. Vazquez**, at the telephone number listed below.

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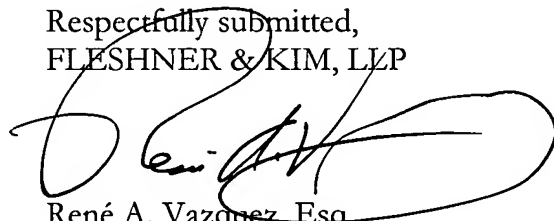
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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,  
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FIG. 4

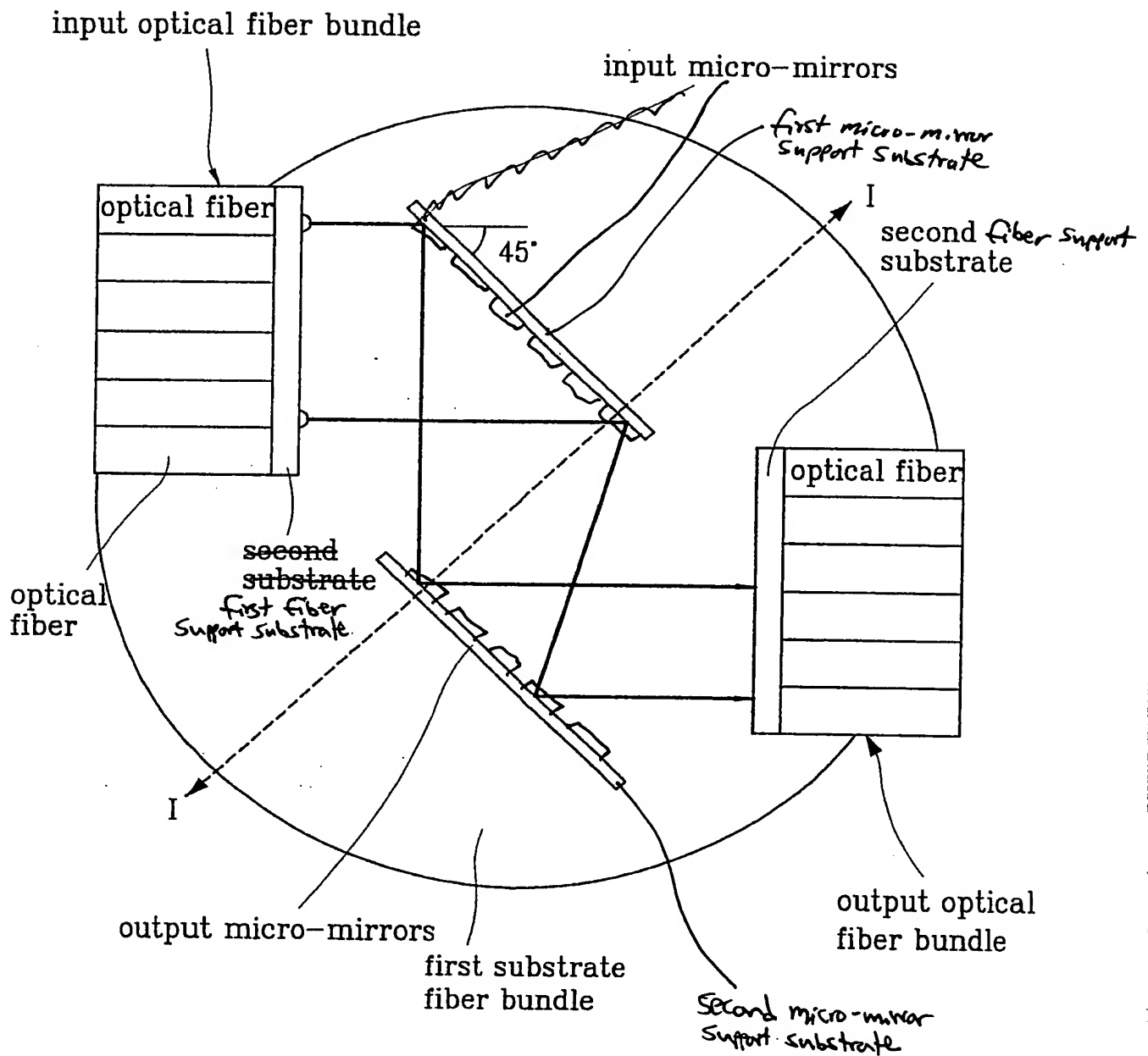




FIG. 7

